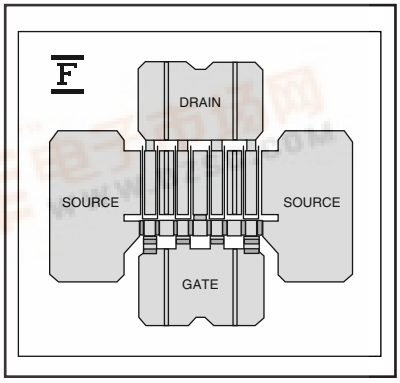
FSX027X

GaAs FET & HEMT Chips

FEATURES

- Medium Power Output: P_{1dB}=24.5dBm(Typ.)@8.0GHz
- High Power Gain: G_{1dB}=10dB(Typ.)@8.0GHz
- Proven Reliability



DESCRIPTION

The FSX027X is a general purpose GaAs FET designed for medium power applications up to 12GHz. These devices have a wide dynamic range and are suitable for use in medium power, wide band, linear drive amplifiers or oscillators.

Fujitsu's stringent Quality Assurance Program assures the highest reliability and consistent performance.

ABSOLUTE MAXIMUM RATINGS (Ambient Temperature Ta = 25°C)

Parameter	Symbol	Condition	Rating	Unit
Drain-Source Voltage	V_{DS}		12	V
Gate-Source Voltage	V_{GS}		-5	V
Total Power Dissipation	P_T	T_C = 25°C	1.5	W
Storage Temperature	T_{STG}		-65 to 175	°C
Channel Temperature	T_{CH}		175	°C

Fujitsu recommends the following conditions for the reliable operation of GaAs FETs:

1. The drain-source operating voltage (V_{DS}) should not exceed 8 volts.
2. The forward and reverse gate currents should not exceed 1.4 and -0.2 mA respectively with gate resistance of 1000Ω.
3. The operating channel temperature (T_{ch}) should not exceed 145°C.

ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25°C)

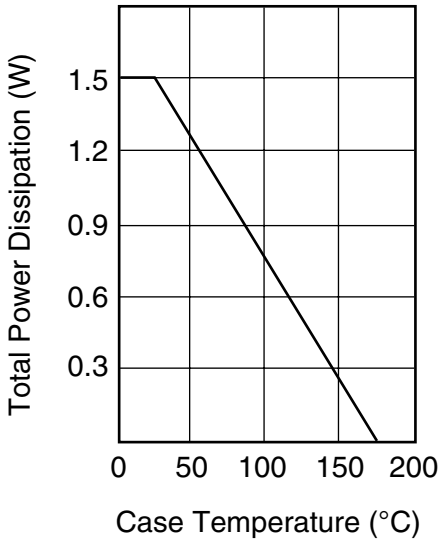
Item	Symbol	Test Conditions		Limit Min.	Limit Typ.	Limit Max.	Unit
Saturated Drain Current	I_{DSS}	V_{DS} = 3V, V_{GS} = 0V		70	110	150	mA
Transconductance	gm	V_{DS} = 3V, I_{DS} = 54mA		-	100	-	mS
Pinch-off Voltage	V_p	V_{DS} = 3V, I_{DS} = 5.4mA		-0.7	-1.2	-1.7	V
Gate Source Breakdown Voltage	V_{GSO}	I_{GS} = -5.4μA		-5.0	-	-	V
Noise Figure	NF	V_{DS} = 3V, I_{DS} = 30mA f = 8GHz		-	2.5	-	dB
Associated Gain	G_{as}			-	9.5	-	dB
Output Power at 1 dB G.C.P.	P_{1dB}	V_{DS} = 8V, I_{DS} = 0.7I_{DSS}	f = 4GHz	-	24.5	-	dBm
			f = 8GHz	23.5	24.5	-	dBm
			f = 12GHz	-	23.5	-	dBm
Power Gain at 1 dB G.C.P.	G_{1dB}	V_{DS} = 8V, I_{DS} = 0.7I_{DSS}	f = 4GHz	-	14.0	-	dB
			f = 8GHz	9.0	10.0	-	dB
			f = 12GHz	-	6.5	-	dB
Thermal Resistance	R_{th}	Channel to Case		-	70	100	°C/W

Note: RF parameter sample size 10pcs. criteria (accept/reject)=(2/3)

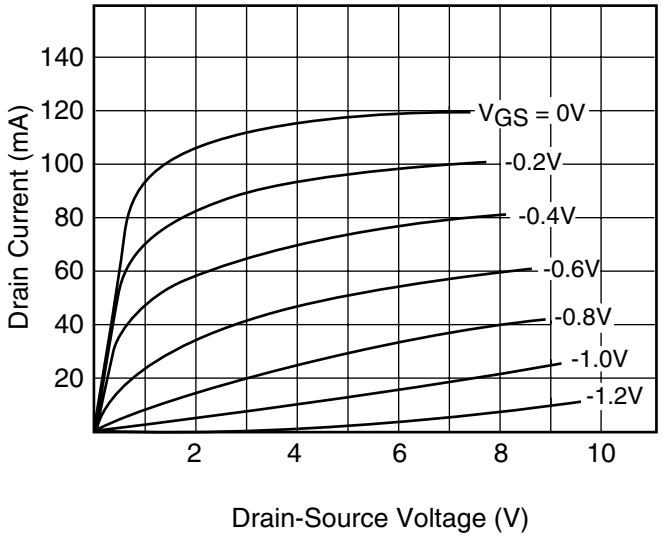
G.C.P.: Gain Compression Point

The chip must be enclosed in a hermetically sealed environment for optimum performance and reliability.

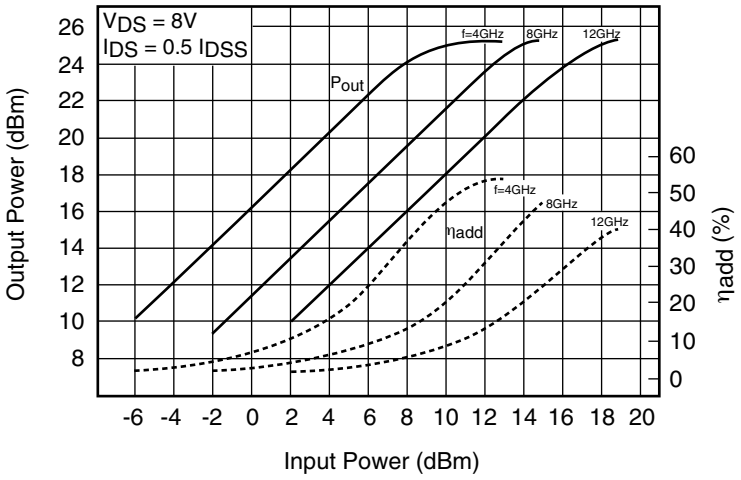
POWER DERATING CURVE



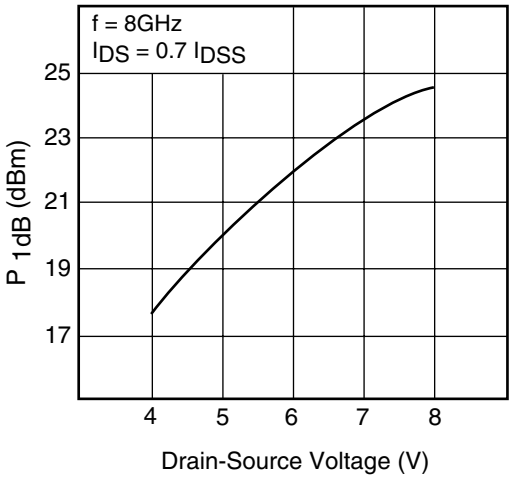
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



OUTPUT POWER vs. INPUT POWER



P 1dB vs. VDS



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S-PARAMETERS

V_{DS} = 8V, I_{DS} = 75mA

FREQUENCY	S11		S21		S12		S22	
(MHZ)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1000	.981	-41.2	7.117	153.2	.023	67.6	.633	-14.9
2000	.946	-75.2	6.065	130.8	.040	50.3	.588	-26.6
3000	.913	-100.3	5.015	113.3	.050	37.4	.548	-35.2
4000	.882	-118.9	4.168	99.4	.055	28.8	.523	-42.1
5000	.877	-132.7	3.520	87.9	.058	22.2	.506	-48.4
6000	.867	-143.6	3.026	77.9	.060	17.3	.498	-54.7
7000	.860	-152.5	2.644	69.0	.062	13.6	.499	-60.9
8000	.854	-159.9	2.336	60.9	.063	10.2	.504	-67.1
9000	.849	-166.3	2.089	53.1	.064	7.0	.515	-73.4
10000	.845	-172.0	1.887	45.8	.065	4.4	.524	-79.0
11000	.841	-177.2	1.716	36.7	.065	2.1	.539	-84.7
12000	.837	178.3	1.569	32.0	.065	0.0	.550	-90.3
13000	.834	174.1	1.441	25.4	.066	-1.0	.561	-95.7
14000	.829	169.8	1.332	18.9	.067	-3.5	.574	-101.2
15000	.826	166.1	1.238	12.6	.067	-5.4	.589	-106.8
16000	.824	162.7	1.155	6.6	.068	-6.1	.603	-112.5
17000	.817	159.3	1.074	.4	.069	-9.1	.623	-118.0
18000	.813	155.9	1.001	-5.5	.068	-10.4	.642	-123.1
19000	.814	152.8	.543	-11.3	.069	-11.2	.657	-127.9
20000	.811	150.1	.888	-16.9	.069	-13.4	.672	-132.7

NOTE:* The data includes bonding wires.
n: number of wires Gate n=1 (0.2mm length, 25µm Dia Au wire)
Drain n=1 (0.2mm length, 25µm Dia Au wire)
Source n=4 (0.2mm length, 25µm Dia Au wire)

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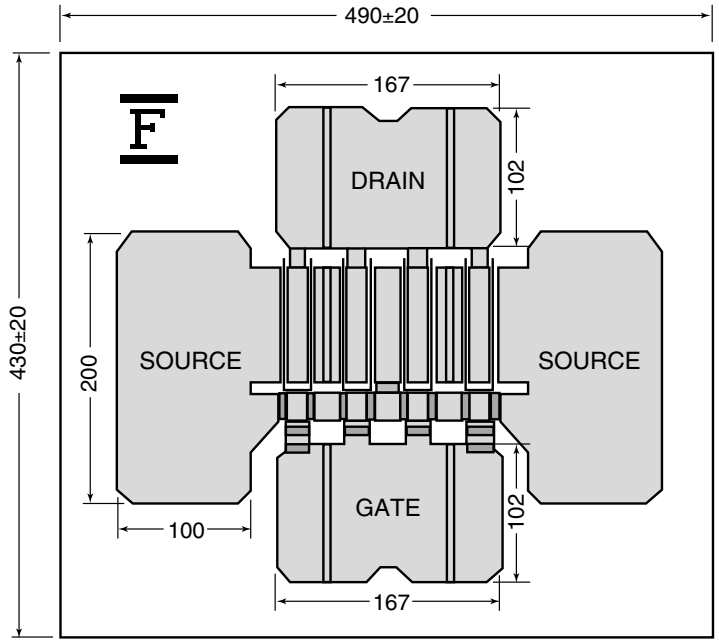
CHIP OUTLINE



Die Thickness: 100±20μm
(Unit: μm)

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CAUTION

Fujitsu Compound Semiconductor Products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- **Do not put these products into the mouth.**
- **Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.**
- **Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.**

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